

What is claimed:

1. A source device, comprising:
 - a plurality of connection interfaces; and
 - a cluster manager configured to determine performance similarities for a plurality of connections and configured to group the plurality of connections into performance clusters based on the determined performance similarities.
2. The source device of claim 1, further comprising a plurality of synchronization mechanisms coupled with a plurality of connection interfaces, wherein the cluster manager is configured to assign a synchronization mechanism to each of the performance clusters.
3. The source device of claim 2, wherein each of the plurality of synchronization mechanisms is configured to provide computations and protocols needed to communicate data over the plurality of connections.
4. The source device of claim 3, further comprising a source data buffer coupled to the plurality of synchronization mechanisms and configured to store information, and wherein the source device is configured to share the data stored in the source data buffer with a plurality of destination devices interfaced with the source device via plurality of connection interfaces.
5. The source device of claim 1, wherein the performance clusters include a high performance cluster.

6. The source device of claim 1, wherein the performance clusters include an intermediate performance cluster.

7. The source device of claim 1, wherein the performance clusters include a low performance cluster.

8. The source device of claim 1, wherein the performance similarity for the plurality of connections is determined based on the bandwidth capability of each of the plurality of connections.

9. The source device of claim 1, wherein the performance similarity for the plurality of connections is determined based on the latency of each of the plurality of connections.

10. The source device of claim 1, wherein the performance similarity is determined based on the connection security of each of the plurality of connections.

11. The source device of claim 1, wherein the performance similarity is determined based on the error rate of each of the plurality of connections.

12. The source device of claim 1, wherein the cluster manager is further configured to detect a change in performance capabilities for one of the plurality of connections and to assign the connection to another performance cluster based on the change in performance capabilities.

13. The source device of claim 1, wherein the cluster manager is further configured to detect a new connection, determine the performance capabilities of the new connection, and add the new connection to a performance cluster based on the performance capabilities of the new connection.

14. The source device of claim 4, wherein each of the plurality of synchronization mechanisms is further configured to replicate the entire source data buffer on the plurality of destination devices and then update the destination devices only when data in the source data buffer has changed.

15. The source device of claim 4, wherein each of the plurality of synchronization mechanisms is further configured to replicate the entire source data buffer on the plurality of destination devices and then update the destination devices only when one of the destination devices requests an update.

16. The source device of claim 4, wherein each of the plurality of synchronization mechanisms is further configured to replicate the entire source data buffer on the plurality of destination devices, and wherein each of the plurality of synchronization devices is further configured to update the destination devices interfaced with the synchronization device only when all such destination devices have requested an update.

17. The source device of claim 1, wherein determining the performance similarities for the plurality of connections comprises:

assigning all of the plurality of connections to a primary performance cluster; and

gathering the average latency for each of the plurality of connections.

18. The source device of claim 17, wherein the cluster manager is further configured to group the plurality of connections into performance clusters based on the average latency of each of the plurality of connections.

19. The source device of claim 17, wherein grouping the plurality of connections into performance clusters further comprises:

determining a mean latency for the primary performance cluster based on the average latencies for each of the plurality of connections;

determining a standard deviation of the average latencies for each of the plurality of connections relative to the mean latency for the primary performance cluster; and

determining the number of performance clusters required based on the mean latency for the primary performance cluster and standard deviation of the average latencies for each of the plurality of connections.

20. The source device of claim 1, wherein grouping the plurality of connections into performance clusters further comprises grouping the connections using a sum-of-squares determination.

21. A network communication system, comprising:

a plurality of destination devices, each of the plurality of destination devices comprising a destination synchronization mechanism and a destination data buffer; and

a source device comprising:

a plurality of connection interfaces configured to support a plurality of connections with the plurality of destination devices, and

a cluster manager configured to determine performance similarities for the plurality of connections made via the plurality of connection interfaces and to group the plurality of connections into performance clusters based on the determined performance similarities.

22. The network communication system of claim 21, wherein the source device further comprises a plurality of source synchronization mechanisms coupled with the plurality of connection interfaces, wherein the cluster manager is configured to assign one of the plurality of source synchronization mechanisms to each of the performance clusters.

23. The network communication system of claim 22, wherein each of the plurality of source synchronization mechanisms and each of the destination synchronization mechanisms are configured to provide computations and protocols needed to communicate data over the plurality of connections.

24. The network communication system of claim 23, wherein the source device further comprises a source data buffer configured to store

information, and wherein the source device is configured to share the data in the source data buffer with the plurality of destination devices.

25. The network communication system of claim 21, wherein some of the plurality of destination devices use high bandwidth connections with the source device, and wherein some of the performance clusters are high performance clusters configured to service the high performance connections.

26. The network communication system of claim 21, wherein some of the plurality of destination devices use intermediate bandwidth connections with the source device, and wherein some of the performance clusters are intermediate performance clusters configured to service the intermediate performance connections.

27. The network communication system of claim 21, wherein some of the plurality of destination devices use low bandwidth connections with the source device, and wherein some of the performance clusters are low performance clusters configured to service the low performance connections.

28. The network communication system of claim 21, wherein the performance similarities for the plurality of connections is determined based on the bandwidth of each of the plurality of connections.

29. The network communication system of claim 21, wherein the performance similarities for the plurality of connections is determined based on the latency of each of the plurality of connections.

30. The network communication system of claim 21, wherein the performance similarities for the plurality of connections is determined based on the connection security of each of the plurality of connections.

31. The network communication system of claim 21, wherein the performance similarities for the plurality of connections is determined based on the error rate of each of the plurality of connections.

32. The network communication system of claim 21, wherein the cluster manager is further configured to detect a change in performance capabilities for one of the plurality of connections and to assign the connection to another performance cluster based on the change in performance capabilities.

33. The network communication system of claim 21, wherein the cluster manager is further configured to detect a new connection, determine the performance capabilities of the new connection, and add the new connection to a performance cluster based on the performance capabilities of the new connection.

34. The network communication system of claim 24, wherein each of the plurality of source synchronization mechanisms is further configured to replicate the entire source data buffer in the destination data buffers of each of the plurality of destination devices and then update the destination devices only when data in the source data buffer has changed.

35. The network communication system of claim 24, wherein each of the plurality of source synchronization mechanisms is further configured to replicate the entire source data buffer in the destination data buffers of each of the plurality of destination devices and then update the destination devices only when one of the destination devices requests an update.

36. The network communication system of claim 24, wherein each of the plurality of source synchronization mechanisms is further configured to replicate the entire source data buffer in the destination data buffers of each of the plurality of destination devices, and wherein each of the plurality of synchronization devices is further configured to update the destination devices interfaced with the source synchronization mechanism only when all such destination devices have requested an update.

37. The network communication system of claim 21, wherein determining the performance similarities for the plurality of connections comprises:

assigning all of the plurality of connections to a primary performance cluster; and

gathering the average latency for each of the plurality of connections.

38. The network communication system of claim 37, wherein the cluster manager is further configured to group the plurality of connections into performance clusters based on the average latency of each of the plurality of connections.

39. The network communication system of claim 37, wherein grouping the plurality of connections into performance clusters further comprises:

determining a mean latency for the primary performance cluster based on the average latencies for each of the plurality of connections;

determining a standard deviation of the average latency for each of the plurality of connections relative to the mean latency for the primary performance cluster;

determining the number of performance clusters required based on the mean latency and standard deviation.

40. The network communication system of claim 21, wherein grouping the plurality of connections into performance clusters further comprises grouping the connections using a sum-of-squares determination.

41. A method for sharing data in a network communication system comprising:

determining the performance similarities for a plurality of connections; and

grouping the plurality of connections into performance clusters based on the determined performance similarities.

42. The method of claim 41, further comprising assigning a synchronization mechanism to each of the performance clusters.

43. The source device of claim 42, further comprising each of the synchronization mechanisms sharing data with a plurality of destination devices.

44. The method of claim 41, wherein determining the performance similarities for the plurality of connections comprises determining the bandwidth capabilities for each of the plurality of connections.

45. The method of claim 41, wherein determining the performance similarities for the plurality of connections comprises determining the latency associated with each of the plurality of connections.

46. The method of claim 41, wherein determining the performance similarities for the plurality of connections comprises determining connection security associated with each of the plurality of connections.

47. The method of claim 41, wherein determining the performance similarities for the plurality of connections comprises determining an error rate associated with each of the plurality of connections.

48. The method of claim 41, further comprising detecting a change in performance capabilities for one of the plurality of connections and assigning the connection to another performance cluster based on the change in performance capabilities.

49. The method of claim 41, further comprising detecting a new connection, determining the performance capabilities of the new connection,

and adding the new connection to a performance cluster based on the performance capabilities of the new connection.

50. The method of claim 43, further comprising replicating the entire source data buffer on the plurality of destination devices and then updating the destination devices only when data in the source data buffer has changed.

51. The method of claim 43, further comprising replicating the entire source data buffer on the plurality of destination devices and then updating the destination devices only when one of the destination devices requests an update.

52. The method of claim 43, further comprising replicating the entire source data buffer on the plurality of destination devices, and updating the destination devices only when all such destination devices have requested an update.

53. The method of claim 41, wherein determining the performance similarities for each of the plurality of connections comprises:

assigning all of the plurality of connections to a primary performance cluster; and

gathering the average latency for each of the plurality of connections.

54. The method of claim 53, further comprising grouping the plurality of connections into performance clusters based on the average latency of each of the plurality of connections.

55. The method of claim 54, wherein grouping the plurality of connections into performance clusters further comprises:

determining a mean latency for the primary performance cluster based on the average latencies for each of the plurality of connections;

determining a standard deviation of the average latency for each of the plurality of connections; relative to the mean latency for the primary performance cluster; and

determining the number of performance clusters required based on the mean latency for the primary performance cluster and standard deviation of the average latency of each of the plurality of connections.

56. The method of claim 41, wherein grouping the plurality of connections into performance clusters further comprises grouping the connections using a sum-of-squares determination.

57. A source device, comprising:

a plurality of connection interfaces; and

a cluster manager configured to:

determine at least one of client service and resource priorities,

determine the performance similarities for a plurality of connections made via the plurality of connection interfaces, and

group the plurality of connections into performance clusters based on the determined performance similarities and the determined service and resource priorities.

58. The source device of claim 57, further comprising a plurality of synchronization mechanisms coupled with the plurality of connection interfaces, wherein the cluster manager is configured to assign a synchronization mechanism to each of the performance clusters.

59. The source device of claim 58, wherein each of the plurality of synchronization mechanisms is configured to provide computations and protocols needed to communicate data over the plurality of connections.

60. The source device of claim 59, further comprising a source data buffer configured to store information, and wherein the source device is configured to share the data stored in the source data buffer with the plurality of destination devices interfaced with the source device via the plurality of connection interfaces.

61. The source device of claim 57, wherein the cluster manager is configured to create fewer performance clusters when it is determined that resource priorities are more important.

62. The source device of claim 57, wherein the cluster manager is configured to create more performance clusters, when it is determined that client service is more of a priority.

63. The source device of claim 57, wherein the cluster manager is further configured to detect a change in performance capabilities for one of the plurality of connections and to assign the connection to another performance cluster based on the change in performance capabilities.

64. The source device of claim 57, wherein the cluster manager is further configured to detect a new connection, determine the performance of the new connection, and add the new connection to a performance cluster based on the performance of the new connection.

65. A source device comprising:
a cluster manager configured to distinguish, from a set of connections, a subset of connections having similar performance capabilities and configured to group the subset of connections together in a performance cluster.

66. The source device of claim 65, wherein the cluster manager is configured to distinguish subsets of connections from a set of connections, wherein each connection in each subset has similar performance capabilities with the other connections in that same subset, and configured to group each of the subsets in a performance cluster.

67. A network communication system comprising:
an intermediate source device, wherein the intermediate source device comprises:

a cluster manager configured to:

determine subsets of connections from a set of connections, wherein each connection in each subset has similar performance capabilities with the other connections in the same subset, and

group each of the subsets in a distinct performance cluster.

68. The intermediate source device of claim 67, further comprising a plurality of synchronization mechanisms, wherein the cluster manager is configured to assign a synchronization mechanism to each of the performance clusters.

69. The intermediate source device of claim 67, wherein each of the plurality of synchronization mechanisms is configured to provide computations and protocols needed to communicate data over the set of connections.

70. The intermediate source device of claim 67 further comprising an intermediate source data buffer configured to store data, and wherein the intermediate source device is configured to share the data stored in the source data buffer with the plurality of destination devices.

71. The intermediate source device of claim 67, wherein the performance clusters include a high performance cluster.

72. The intermediate source device of claim 67, wherein the performance clusters include an intermediate performance cluster.

73. The intermediate source device of claim 67, wherein the performance clusters include a low performance cluster.

74. The intermediate source device of claim 67, wherein similarity in the performance capabilities for each subset of connections is determined by the similarity in connection bandwidth.

75. The intermediate source device of claim 67, wherein similarity in the performance capabilities for each subset of connections is determined by similarity in connection latency.

76. The intermediate source device of claim 67, wherein similarity in the performance capabilities for each subset of connections is determined by similarity in connection security.

77. The intermediate source device of claim 67, wherein similarity in the performance capabilities for each subset of connections is determined by similarity in connection error rate.

78. The intermediate source device of claim 67, wherein the cluster manager is further configured to detect a change in performance capabilities for a connection in one performance cluster and to assign the connection to another performance cluster based on the change in performance capabilities.

79. The intermediate source device of claim 67, wherein the cluster manager is further configured to detect a new connection, determine the performance capabilities of the new connection, and add the new connection to a performance cluster based on the performance capabilities of the new connection.

80. The intermediate source device of claim 68, wherein each of the plurality of synchronization mechanisms is further configured to replicate data in the intermediate source data buffer on the plurality of destination devices and to then update the destination devices only when data in the intermediate source data buffer has changed.

81. The intermediate source device of claim 68, wherein each of the plurality of synchronization mechanisms is further configured to replicate data in the intermediate source data buffer on the plurality of destination devices and to then update the destination devices only when one of the destination devices requests an update.

82. The intermediate source device of claim 68, wherein each of the plurality of synchronization mechanisms is further configured to replicate data in the intermediate source data buffer on the plurality of destination devices, and wherein each of the plurality of synchronization devices is further configured to update the destination devices only when all such destination devices have requested an update.

83. The intermediate source device of claim 68 further comprising an intermediate synchronization mechanism.

84. The network communication system of claim 83 further comprising:

a remote source device comprising:

a remote synchronization mechanism that is coupled to the intermediate synchronization mechanism via a remote connection and

a remote source data buffer.

85. The remote source device of claim 84, wherein the remote synchronization mechanism and the intermediate synchronization mechanism are configured to provide computations and protocols needed to communicate data over the remote connection.

86. The remote source device of claim 84, wherein the remote source data buffer is configured to store data, and wherein the remote source device is configured to share the data stored in the remote source data buffer with the intermediate source device.

87. The network communication system of claim 83, wherein the remote synchronization mechanism is further configured to replicate data in the remote source data buffer on the intermediate source data buffer and then update the destination devices only when data in the remote source data buffer has changed.